REMARKS

Claims 1-17, 19-21, 23, 25-35 and 37-39 are still pending in the application. Claims 1-17, 19-21, 23, 25-35 and 37-39 stand rejected in the Office Action mailed August 21, 2003. Claims 4, 5 and 9 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all the limitations of the base claims and any intervening claims. The applicants wish to extend their thanks to the Examiner for her indication of allowable subject matter.

Applicants respectfully request that the above-identified application be reconsidered in view of the remarks which follow, and that each of the presently pending claims be allowed and the application be passed to issue.

35 USC 103

Claims 1-3, 6-8, 14, 15, 19-21, 23, 25-28, 30-35 and 37-39 stand rejected under 35 U.S.C. 10(a) as being obvious over Weaver et al. (US 2,894,726) in view of Galis (US 3,613,807).

It is respectfully submitted that the rejection of claim 1 under 35 USC 103 is improper and should be withdrawn. In each of the present independent claims 1, 19, 23, 32 and 37, the rotary roof bit is recited as being monolithic and having three cutting edges. The Examiner admits that Weaver does not disclose a roof bit insert that is monolithic, but avers that in view of Galis' teaching it would have been obvious to construct the roof bit head insert in Weaver ("18") as an integral monolithic insert.

The cutting edges in Weaver et al. are formed by a plurality of separate inserts 24 made from tungsten carbide as described in column 3, lines 3-15. The inserts 24 are received in recesses forged in the blade 14. The inserts 24 are secured to the blade 14 either by a shim of soldering material, column 7, lines 25-47. The monolithic blade 14 in Weaver et al., forged as one piece, does not form the cutting edges of the bit. The three cutting edges are formed by a plurality of inserts 24.

The plurality of inserts themselves in Weaver et al. are disclosed in Weaver et al. as, preferably, being nonuniform in composition. The outer corners of the inserts contain harder particles than the remaining portion of the inserts. The harder particles reduce the otherwise greater wear that would occur at the outer corner of the insert during operation. Weaver et al. discloses impregnating the corners of the inserts with diamond-like particles, see column 7, lines 5-25. This impregnation design results in the wear pattern shown in

figures 17-19 of Weaver. It is averred in Weaver that this wear pattern is superior to a uniform wear pattern across the initial horizontal cutting edge. As indicated in column 7, lines 9-11, of Weaver et al., "When the drilling load is imposed upon the bit with a substantial width of horizontal face, more fracturing will occur." The purpose of impregnating the corners of the cutting edge of Weaver et al. with hard materials is to prevent such catastrophic failure that would occur in a monolithic bit having a uniform composition. As commonly defined, a monolith, in *the Random House Dictionary,* is defined as having total uniformity.

The Examiner incorporates the Galis reference as teaching construction bits as a monolithic hard insert that resists damage at substantial cutting forces. The Examiner points to "(... col. 3, lines 1-5) as evidence in support of her conclusion. The Examiner believes that, since the drill in Galis was intentionally designed to have structure that would cause it to last longer under greater forces, presumably the insert head in Galis is designed to last longer under greater forces. It is admitted by applicants that the purpose of the design in Galis is to strengthen roof bit drill heads so they would not fail during operation at increased drill speeds and percussive forces. Galis prevents these failures by designing a drill rod that includes a solid core member and a concentric tubular outer member having holes therein to remove dust (see column 1, lines 38-43). The entire emphasis of the specification and claims, including the Summary of the Invention, is on the drill rod having a solid core member with a surrounding concentric tube for transmitting dust. Each of figures 3-6 illustrates other configurations of the solid inner core. The overriding purpose of Galis is to reduce the problems of drill rod flare and increase the amount of rotary torque that can be applied to the drill rod, see column 1, lines 48-54. The focus in Galis is on prior art drill rod failures and shortcomings. The only details of the drill head insert 29 in Galis are described in column 2, lines 12-25, and relate to the shape of the drill head shank 28 and its cooperation with the drill rod. It is submitted that an artisan might be motivated to modify Weaver et al. to have a solid core with a concentric pipe for conveying dust to strengthen the earth-boring drag blade, but there is no motivation that can be taken from Galis to construct the drill head ("18") in Weaver et al. to be monolithic.

The design and construction of the cutting edges and forward portion of the drill head bit are not provided. Reference is made to the type of materials that are used to construct the drill rod in column 3, lines 40-58, but not the material used for the drill head 29

in Galis. It should be noted that the Examiner failed to clarify if the Galis reference taught making the Weaver et al. insert to be monolithic and constructed from the hard material (insert at 24 in Weaver et al.) or the softer forged material at 20 in Weaver et al. It is presumed that the Examiner intended to consider it obvious in view of Galis to construct the entire drill head insert ("18") in Weaver et al. from the same hard material as the plurality of inserts 24. As discussed immediately above, there is no disclosure in Galis regarding what the drill head insert 29 is constructed from. It is unclear, for instance, if it is made from a hard material such as carbide (see Weaver et al., column 3, line9). The Examiner is speculating as to the composition of the drill head material in Galis. There is no motivation to construct the drill head insert in Weaver et al. to be constructed as monolithic tungsten carbide, steel or any other specific material. Galis does not disclose any preference for the drill head insert material or details of the composition employed to construct the drill head ("18"). There is no disclosure of tungsten carbide (or any other hard material) used for the drill head insert in Galis. The Examiner, at best, would be speculating what material is used to make the drill head in Galis.

The Galis patent does not even disclose the necessary material composition that would imply or infer to an ordinary artisan that, by constructing Weaver et al.'s drill head bit as a monolithic hard material drill head bit from any such material composition, would allow for the drill bit to be used in situations where "a substantial cutting force [may be applied] to the bit without damaging the insert" as set forth in the Examiner's rejection. The torsional and percussive forces that the drill cutting edges in Galis are subjected to are not disclosed therein. The Examiner appears to be making an assumption, without support from the references themselves, that the torsional and percussive forces Weaver et al. was designed to be subjected to are not as great as those percussive and torsional forces that the drill Galis was designed to withstand. For a proper rejection under 35 USC 103, the Examiner must find proper motivation in the references themselves. The forces that the Galis drill was designed to endure might as well have been less than the forces the Weaver et al. patent was designed to encounter.

Galis does not disclose a monolithic drill head insert made from tungsten carbide, explicitly or implicitly, nor does it explicitly disclose any motivation, such as advantages over prior art, in making a drill head insert monolithic. Nor can any motivation be implied as the respective percussive forces that Weaver et al. and Galis were designed to

endure are not disclosed. Further, Weaver et al. discloses a preference for a cutting edge that is not monolithic, but includes a composition having elements dispersed in a nonuniform fashion therein. It is respectfully submitted that the Examiner is fabricating motivation to combine Weaver et al. and Galis, and that neither imply nor explicitly provide motivation for combining the references as set forth by the Examiner.

It should also be noted that the Weaver et al. patent and the Galis patent are nonanalogous art. Weaver et al. is an earth boring drag bit and Galis is a roof bit system for drilling holes in the ceiling of mines so that a support can be inserted therein. The Examiner has not demonstrated that the prior art discloses adequate motivation, as required under 35 USC 103, to establish a *prime facie* case of obviousness. The Examiner is employing impermissible hindsight and the present application as a guideline in constructing the claimed invention.

In view of the above amendments and comments, it is believed that independent claims 1, 19, 23, 32 and 37are patentable over the above 35 USC 103 rejection, and that all the dependent claims thereon, claims 2, 3, 6-8, 14, 15, 20-21, 25-28, 30, 31, 33-35 and 38-39 are likewise allowable over the above rejection.

Claims 10-12, 16, 17 and 29 stand rejected under 25 U.S.C. 103(a) as being unpatentable over Weaver et al. in view of Galis and Brady.

The Examiner has not established a proper *prime facie* case of obviousness under 35 USC 103. There is no motivation to combine the references as averred by the Examiner. It is believed that such tensile fracture problems would be more problematic with larger cemented tungsten carbide inserts than a drill with a plurality of smaller inserts as in Weaver et al. The Brady patent discloses a roof bit not with three stepped cutting edges, but a bit with two curved cutting edges.

In view of the above amendments and comments, it is believed that independent claims 10-12, 16, 17 and 29 patentable over the above 35 USC 103 rejection.

Claim 13 stands rejected under 25 U.S.C. 103(a) as being unpatentable over Weaver et al. in view of Galis and Nance. It is respectfully submitted that the Examiner has not established a proper *prime facie* case of obviousness under 35 USC 103. In Nance, the roof bit cutting edge includes a cutting edge having an upper portion 30 and an outer portion 34. The upper portion and outer portion, as shown in figures 5 and 6 respectively, have relief angles "A" and "B" that are described in column, 3 lines 59-62, as both being twenty-five

(25) degrees. Also, in column 2, lines 20-25, the relief angles of the upper portion and end portion of the cutting edge are disclosed as being equal.

Claim 13 recites that the upper cutting edge has a relief angle of 30 degrees and the lower cutting edge step has a relief angle of 21 degrees. This recitation is in direct contrast to the description in Nance that the relief angle of the cutting edge remain constant along the length of the cutting edge. Nance teaches away from the limitations recited in claim 13. There is no teaching in Nance nor in Weaver et al. to construct a stepped bit wherein the relief angle of an upper step differs from the relief angle of the lower step. The Examiner has failed to establish a proper *prime facie* case of obviousness. In view of the above amendments and comments, it is believed that independent claim 13 is patentable over the above 35 USC 103 rejection.

Claims 1-3, 6-8, 14, 15, 19-21, 23, 25-28, 30-35and 37-39 were rejected by the Examiner under 35 USC 103(a) as being obvious over Weaver et al. in view of Dunn et al. Independent claims 1, 19, 23, 32 and 37 each recite the rotary roof bit as being monolithic and having three cutting edges.

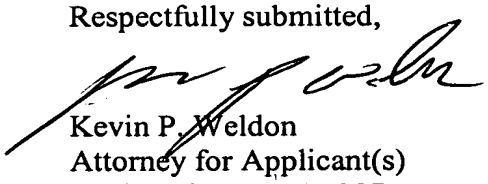
The plurality of inserts themselves in Weaver et al. are disclosed in Weaver et al. as, preferably, being nonuniform in composition. The outer corners of the inserts contain harder particles than the remaining portion of the inserts. The harder particles reduce the otherwise greater wear that would occur at the outer corner of the insert during operation. Weaver et al. discloses impregnating the corners of the inserts with diamond-like particles, see column 7, lines 5-25. This impregnation design results in the wear pattern shown in figures 17-19 of Weaver et al. It is averred in Weaver et al. that this wear pattern is superior to a uniform wear pattern across the across the initial horizontal cutting edge. As indicated in column 7, lines 9-11, in Weaver et al., "When the drilling load is imposed upon the bit with a substantial width of horizontal face, more fracturing will occur." The purpose of impregnating the corners of the cutting edge of Weaver et al. with hard material is to prevent such catastrophic failure that would occur in a monolithic bit having a uniform composition. As commonly defined, a monolith, in *the Random House Dictionary,* is defined as having total uniformity. There is no suggestion in Weaver et al., itself, to make the plurality of inserts on the drill head ("18") monolithic. In fact, Weaver et al. teaches a preference for impregnating the cutting edge corner of the drill head in Weaver et al. with hard materials, such as diamonds. The Examiner is requested to identify in the Dunn reference where

explicit motivation to have a drill bit that lasts longer to modify Weaver et al., as proposed, may be garnished and/or where such type implicit motivation to modify Weaver et al. is derived. The Examiner has failed to establish a proper *prime* facie case of obviousness under 35 USC 103 in view of Dunn and Weaver et al. In view of the above amendments and comments, it is believed that independent claims 1, 19, 23, 32 and 37 are patentable over the immediately above 35 USC 103 rejection, and that all the dependent claims thereon, claims 2, 3, 6-8, 14, 15, 20-21, 25-28, 30, 31, 33-35 and 38-39 are likewise allowable over the above rejection.

In view of the above amendments and comments, it is believed that claims 1-17, 19-21, 23, 25-35 and 37-39 are patentable over the art of record. Thus, applicants respectfully request a Notice of Allowance indicating claims 1-17, 19-21, 23, 25-35 and 37-39 as being allowable. If for any reason the Examiner does not believe that the application is in condition for allowance, the Examiner is requested to telephone applicants with any comments or questions (724-539-3848) in order to expedite prosecution of the application.

The Commissioner is hereby authorized to charge any fees, including additional filing fees required under 37 CFR 1.16 and 1.17, in connection with this submission to Kennametal Inc.-AMSG corporate Deposit Account 502832.

Respectfully submitted,



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